

Keywords

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Tribute to Scientific Contributions of Vladimir Cermak

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Summary

Dr. Vladimír Čermák is currently one of the well-known research scientists in the field of global Geothermics. Initiated his early works measuring terrestrial heat flow, first in Czechoslovakia but later extending into various other European countries. At the Geophysical Institute (Prague) he defended his PhD work (1967) and his DrSc thesis (1981). Under broad international cooperation these activities lead to the construction of the first continental scale heat flow map of Europe. Later, he became the Director of the Institute of Geophysics (1990-1998), now of the Academy of Science of the Czech Republic, where at present serves as Emeritus Professor of Sciences. He is author of more than 300 publications in Geothermics. He is well known for the pioneering works on long-term monitoring of subsurface temperatures in the famous geothermal borehole of Prague since 1990. Systematic monitoring of temperatures in this borehole continues to the present day. He was honoured at the 2015 IUGG meeting. The proposed 2022 meeting of the International Heat flow Commission – IHFC is named after Vladimir Cermak.

1. Introduction

Dr. Vladimír Čermák, is currently one of the well-known research scientists in Geothermics. Born on May 17, 1937 in Prague, Czech Republic, he graduated at the Faculty of Mathematics and Physics of the Charles University (1960), and later joined as research scientist at the Geophysical Institute of Czechoslovak Academy of Sciences.

During 1968 – 1970 he worked as post-doctoral fellow at the Dominion Observatory in Ottawa (Canada) and carried out notable works in deriving maps of subsurface thermal effects of recent climate changes. During the decade of 1970 he extended similar works to the continent of Europe. Following this he worked actively on various aspects of geothermics under the auspices of the International Union of Geodesy and Geophysics (IUGG). Following this he was designated as the director of the Institute of Geophysics of the Czech Academy of Sciences, for the period of 1991–1998. Was elected as Chairman of the International heat flow commission - IHFC for the period of 1995 – 1999. He acted also one of the Vice-Presidents of European Society of Geophysics for the period of 1994–1998. He was the main organizer of a series workshops and international conferences, known within the geothermal community as the Castle Meetings, during the period of 1990 to 2015. He also took part in the organization of the XXVI General Assembly of IUGG in Prague.

He has published so far more than three hundred articles in Geothermics and Geothermal Energy. He is well known for the pioneering works on long-term monitoring of subsurface temperatures in the famous geothermal borehole of Prague since 1990. Monitoring of temperatures in this borehole continues to the present day.



Figure 1 - Vladimir Čermák (LinkedIn personal).

2. Principal directions of current research

His main research area is based on studies of heat flux in crust and lithosphere. Also, deals with topics of geothermal modeling, dynamics of earth's crust, thermal conductivity of rocky material, mapping heat flow density, inversion of well temperature data in study of the history of surface temperature, recent climate change, ground-air temperature coupling and monitoring of temperature changes in shallow wells.

3. Air Temperature variability Trends

As one of his most recent scientific contributions, we highlight the studies on variation of soil-air (surface) temperatures carried out between the years 2003-2017. In 2018, the International Journal of Earth Sciences launched a special edition on recent advances in Heat Flow studies. In this issue, Čermák and Bodri (2019) pointed out tendencies of variability in series of air temperatures. This work examined the causal relationship between soil-air temperature and precipitation changes for data series monitored in shallow water systems of Prague under different land cover (soil, sand, grass and asphalt). The results of the Granger causality test did not reveal any evidence of precipitation for soil-air temperature displacements except for asphalt paving. On the contrary, strong evidence was found in the time scale for all types of cover, except for sand. The results provided valuable information about the delay time of soil surface temperature and surface air temperature caused by rain and confirmed the importance of using autoregressive models in understanding the soil temperature/air ratio.

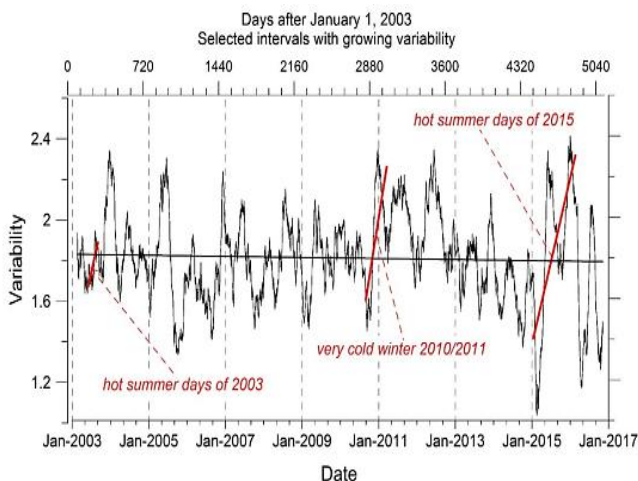


Figure 2 – Variability of SAT data at the Sporilov station (running average for 100 consecutive days). Intervals with large variability are highlighted (taken from Cermak et al., 2019)

4. Publications

As has been said, Dr Vladimir Čermák has about 300 publications, as author and co-author in several international journals, as well as three published books, listed below:

1. Borehole Climatology (Bodri and Čermák - 2007);
2. Terrestrial Heat Flow and the Lithosphere Structure (Čermák and Rybach – 1991);
3. Terrestrial heat flow in Europe (Čermák and Rybach – 1979).

Had participation in 20 chapters of books, as author or co-author (see table 1). It includes abstracts of works in congresses, symposiums and conferences, as well as technical reports promoted for field data acquisition.

Table 1 – Chapters in books and Journals.

Authors	Title	Year
Cermak; Dedecek; Safanda; Kresl	Climate Warming in the Czech Republic: Evidence Stored in Shallow Subsurface	2010
Bodri; Cermak.	Subsurface Temperature Monitoring: Present-Day Temperature Change and Its Variability	2007
Bodri and Cermak	Background and History of the Problem	2007
Bodri; Cermak	Ground Temperature Histories: Evidence of Changing Climate	2007
Bodri; Cermak.	Climate Change and Subsurface Temperature	2007
Vladimir Cermak	Results of Heat Flow Studies in Czechoslovakia	1994
Cermak, Beck and Hamza	International Meeting o Geothetics and and Geothermal Energy- Guaruja (Brazil)	1995
Cermak; Kral; Kresl; Safanda	Heat Flow, Regional Geophysics and Lithosphere Structure in Czechoslovakia and Adjacent Part of Central Europe	1991
Cermak; Bodri; Rybach	Radioactive Heat Production in the Continental Crust and Its Depth Dependence	1991
Cermak; Bodri	On the vertical distribution of radiogenic heat production in the continental crust and the estimated Moho heat flow	1989
Cermak	Heat flow in a sedimentary basin in Czechoslovakia: Evaluation of data with special attention to hydrogeology	1989
Cermak; Rybach	References for 4.1	1982
Cermak; Rybach	Table 7 (sedimentary rocks) - Table 14	1982
Cermak; Rybach	4.1.2.1 Minerals	1982
Rybach; Cermak	4.4.3 References for 4.4	1982
Rybach; Cermak	4.4.1 Introduction	1982
Rybach; Cermak	4.4.2 Data	1982
Cermak; Rybach	Table 7 (igneous - Metamorphic rocks)	1982
Rybach; Cermak	Radioactive heat generation in rocks	1982
Cermak; Rybach	Thermal Conductivity and Specific Heat of Minerals and Rocks	1982
Cermak	Review of Heat Flow Measurements in Czechoslovakia	1979

5. International and National Memberships Positions and Awards

Throughout his career, Vladimir Čermák actively participated in all aspects of administration. His trajectory is based on positions held in scientific commissions and societies such as:

- International Heat Flow Commission of the IASPEI (member since 1971), Secretary (1987-1991), President (1995-1998)
- European Geophysical Society (member since 1990), Vice President for Solid Earth (1994-1998)
- Chairman of the Local Organization Committee IUGG2015
- International Geothermal Association (IGA), Board of Directors, (member 1993-1999)
- European Academy (member 1991-2015)
- American Geophysical Union (member since 1990)
- Deutsche Geophysikalische Gesellschaft (member since 1994)
- Editorial Board of *Studia Geophysica et Geodetica* (since 1990)
- Editorial Board of *International Journal of Earth Sciences* (since 2006)
- President of the Czech National Committee for Geodesy and Geophysics (1999-2015) Czech Delegate to the General IUGG Assembly (1999-2015)
- Chairman of Evaluation Committee for title of doctor of the Academy of Sciences of the Czech Republic (since 2001)

Awards Obtained:

- Silver Medal of the Czechoslovak Academy of Sciences for Merits in Physical Sciences (1987)
- Edward A. Flinn III Medal of the American Geophysical Union (1995)
- O.Yu. Schmidt Medal of the Institute of the Physics of the Earth, Russian Academy of Sciences (1995)
- Patricius Plakette of the Deutsche Geothermische Vereinigung e.V. (1998)
- Ernst Mach Medal for Merits in Physics of the Academy of Sciences of the Czech Republic (2003)



Figure 2 – Dr. Vladimir Cermak in open ceremony 26th IUGG, 2015.

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